REMARKS

This Request for Continuing Examination (RCE) is filed in response to the Advisory Action mailed March 12, 2007. In the Advisory Action, the Examiner maintained his rejection of all pending claims (1, 10-13, 15, 16, 30, and 32). In this RCE, claims 1 and 13 are amended and claims 30 and 32 are canceled. The Applicants submit that the Examiner's prior rejections are mooted by the amendments to the claims in this RCE.

In the Final Office Action, the Examiner rejected claims 1, 10-13, 15, 16, 30, and 35 as obvious under 35 USC § 103(a). The Examiner cited US Patent No. 5,868,948 to Fuji et al. (Fuji et al. hereinafter), in combination with the admitted prior art and US Patent No. 5,022,130 to EerNisse et al. (EerNisse et al. hereinafter) as the basis for this rejection. The Examiner maintained these rejections in the Advisory Action.

The rejected independent claim 1 recites a process for producing an acoustic resonator device in which a first film is deposited on a substrate and patterned. A continuous piezoelectric layer is deposited over the patterned first metal layer. A second metal layer is deposited over the piezoelectric layer and patterned after which some or all of the piezoelectric material "not involved in signal transmission" is removed to limit lateral propagation losses to un-etched regions of the acoustic resonator device. Claim 1 has been amended to specify that the second metal layer is patterned into a plurality of electrodes and that the piezoelectric material in the region underlying the spaced apart region between the electrodes is removed. Support for this amendment is found on page 7, lines 17-24 and FIGs. 4 and 5.

Independent claim 13, as amended, also recites a method in which the second metal layer is patterned into a plurality of electrodes and in which some of the continuous piezoelectric layer is removed by selective etching to limit

propagation of energy in lateral modes. The removed portion is the portion underlying the spaced apart region between electrodes. Support for this amendment is found on page 7, lines 17-24 and FIGs. 4 and 5.

Thus, both independent claims 1 and 13 recite a method for making an acoustic resonator device in which the lateral propagation of energy to other regions on the substrate is limited. Further the lateral propagation is limited by removing the portion of the piezoelectric material that is in the region defined by the region between the electrodes formed over the piezoelectric layer. Applicants submit that nothing in the cited references teaches or suggests a method in which piezoelectric materials are removed to reduce or eliminate propagation of energy to other regions of the substrate that might be adversely affected by that energy by removing the piezoelectric material from these defined regions.

This concept is clearly not taught or suggested by Fuji et al. Fuji et al. is concerned exclusively with etching dielectric materials (primarily ferroelectric materials). As such, Fuji et al focuses exclusively on forming discrete devices. Note specifically FIG. 12 of Fuji et al. which is a cross-section of a pyroelectric infrared detector formed using the etching techniques described in that reference. Applicants observe that this device is discrete. The propagation of energy from the pyroelectric film 1203 to other ferroelectric regions on the substrate 1201 is not a problem that is addressed, or inherently solved by Fuji et al. because there is no "plurality of electrodes" in the Fuji et al. device.

In the Advisory Action and previous rejections, the Examiner contends that Fuji et al. inherently limits lateral propagation losses. Applicants previously disagreed with the Examiner's position. In this RCE the claims have been amended to recite a method in which a plurality of electrodes is formed

on the piezoelectric material. Fuji et al. describes a method for forming a discrete device and does not expressly or inherently disclose electrodes. Consequently, Applicants submit that the Examiner's rejection based on inherent disclosure in Fuji et al. is moot in view of Applicants' amendments to independent claims 1 and 13.

Specifically, Fuji et al. does not contemplate removing dielectric material from a region defined by the region between a plurality of electrodes. In fact, certain embodiments of Fuji et al. teach away from this concept. Referring to FIG. 6 of Fuji et al., there remains a tapered dielectric region extending along the longer, lower electrode 402 but extending beyond the upper electrode 404. Fuji et al. clearly does not require removal of dielectric material that does not underlie the electrode. It is for these reasons that Applicants submit that the removal of piezoelectric material that underlies the spaces between electrodes, thereby removing piezoelectric not involved in signal transmission, is clearly not inherent in Fuji et al.

Therefore, Applicants submit that Fuji et al. does not disclose or suggest a method in which the piezoelectric material is etched in the claimed regions because there is no "plurality of electrodes" formed on the dielectric material in Fuji et al. This distinction holds for both claim 1 and claim 13. Therefore, Fuji et al. does not disclose or suggest selectively etching the dielectric material to limit lateral propagation by removing those portions of the dielectric layer underlying the spaces between the electrodes. It is for this reason that Fuji et al. does not render obvious Applicants' invention.

In response to the Applicants' arguments, the Examiner responded, in the Advisory Action mailed March 12, 2007, that the removal of piezoelectric material not involved in signal transmission is inherent in Fuji et al. because any removed

piezoelectric material would inherently not be involved in signal transmission once the piezoelectric material is removed. "So based on the operation of the piezoelectric device and an understanding of what function a piezoelectric material has, the deflection (e.g. propagation of energy in lateral modes) is limited by the amount of material present during operation, i.e. signal transmission." Page 3, Advisory Action.

In response to the Examiner's comments, Applicants have further amended claims 1 and 13 in the manner described above. The amended claims specify that an array of electrodes is formed on the piezoelectric material. The amended claims further specify that the piezoelectric material subsequently removed is those portions underlying the regions between the electrodes in the array. This aspect of Applicants' invention is clearly not taught or suggested by Fuji et al. While Fuji et al. may contemplate removing piezoelectric material in the context of forming a discrete device, Fuji et al. clearly does not contemplate forming an array of TFRs and removing piezoelectric material from between the regions the underlie the space between the electrodes in the TFR array.

With regard to what the Examiner denominates as "the admitted prior art" certainly nothing there discloses or suggests removing the underlying piezoelectric material from the regions between a plurality of electrodes formed over the layer of piezoelectric material. Specifically, nothing in the "admitted prior art" teaches or suggests any differentiation between the portion of the dielectric involved in signal transmission and the portion not so involved. Therefore, Applicants submit that the admitted prior art, either alone or in combination with Fuji et al., does not describe the removal of piezoelectric material underlying the spaces between a plurality of electrodes formed over the piezoelectric material.

The Examiner contends that EerNisse et al., in combination with Fuji et al. and the admitted prior art, renders obvious the claimed method. EerNisse et al. describes removing or abrading the bulk crystal in the resonator devices described therein to reduce the gamma vector of the device (the gamma vector, described in Col. 1, ll. 45-46 of EerNisse et al., is the resonator's sensitivity to acceleration). EerNisse et al. is concerned with controlling the acceleration sensitivity of the resonator by reducing the gamma vector, and not reducing lateral propagation losses. Thus, in stark contrast to the present invention, EerNisse et al. describes a process in which the gamma vector of a device is measured and compared against a desired value. If the gamma vector is greater then a desired value, then the bulk crystal is either added to or reduced to bring about a desired reduction in the gamma vector. Note that EerNisse et al. does not contemplate a plurality of electrodes formed on a piezoelectric layer. Nor does EerNisse et al. identify a portion of piezoelectric material not involved in signal transmission and remove that portion. Indeed, EerNisse et al. contemplates removing or changing the portion of the crystal that is active. See Col. 2, ll. 49-55 ("In particular, it has been found that by adding bulk to selected locations on the surface of the crystal, the shape and/or location of the active region or vibration of the crystal can be changed and thus the acceleration sensitivity (represented by the gamma vector) of the crystal can be effectively reduced."). Therefore, EerNisse et al. does not teach one skilled in the art to remove portions of a piezoelectric material layer that underlie spaces between a plurality of electrodes to either limit lateral propagation losses into those regions or limit lateral propagation losses to unetched regions.

With regard to the dependent claims (10-12, 15, and 16) Applicants submit that these claims are patentable over the cited combination of references (i.e. Fuji et al. either alone or in combination with the cited prior art and EerNisse et al.) for the same reasons that claims 1 and 13 are not obvious in view of, and therefore patentable over, these references. For this reason, the Examiner is respectfully requested to withdraw the obviousness rejection of claims 10-12, 15, and 16.

In the Final Office Action, the Examiner also rejected claims 10-12 based upon the cited art (Fuji et al., the admitted prior art and EerNisse et al.) and further in view of US Patent No. 5,129,132 to Zdeblick et al. (Zdeblick et al. hereinafter). As noted above, claims 10-12 depend from claim 1 and are patentable over the cited references for the same reasons that claim 1 are patentable over the cited references. Although Zdeblick et al. generally describes forming a device having multiple piezoelectric layers, and describes the use of lithographic patterning to fabricate some of those layers, the similarities between the Zdeblick et al. and Applicants' claims end there. The piezoelectric material in Zdeblick et al. is used for bimorph cantilevers. As such, Zdeblick et al. clearly does not disclose or suggest (either actually or inherently) removing portions of the piezoelectric material that underlie the spaces between a plurality of electrodes overlying the piezoelectric layer to limit lateral propagation of energy in the remaining piezoelectric material. Consequently, Applicants submit that claims 10-12 are not obvious in view of the cited references. The Examiner is respectfully requested to withdraw the obviousness rejection of claims 10-12.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is

respectfully requested to withdraw the outstanding rejection of the claims and to pass this application to issue.

If, however, for any reason the Examiner does not believe that such action can be taken at this time, it is respectfully requested that he telephone applicant's attorney at (908) 654-5000 in order to overcome any additional objections which he might have. If there are any additional charges in connection with this requested amendment, the Examiner is authorized to charge Deposit Account No. 12-1095 therefor.

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Respectfully submitted,

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